

Identifying, reducing, and controlling environmental costs

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Recently, organizations of all sizes and complexities have started to examine new ways to evaluate their cost information, including capital and operating expenses. Controlling these expenditures, especially overhead costs such as those associated with environmental management, has become an important management consideration.

There is also a transformation in the way in which facility level decisions about environmentally related capital expenditures (pollution prevention, waste treatment, etc.) are being made. As senior management recognizes the increased return to stockholders achieved by adopting "green accounting," it increasingly turns to new and innovative means to account for environmental costs in order to make informed decisions.

Identification and elimination of unnecessary environmental, health, and safety (EHS) costs offer a company many opportunities to improve the bottom line. In addition, companies undertake EHS activities to comply with a myriad of local, state, and federal regulations. The development of an environmental management system and adequate, timely information with which to make decisions lead to the elimination of unnecessary environmental expenses through the adoption of pollution pre-

Key concepts

The biggest task facing environmental managers is how to engage senior management in a dialog about their problems and the positive results attained by solving them.

There are three major types of environmental costs: compliance, preventive, and green.

The first step in evaluating expenses is to establish topics for data collection, such as cost types, process categories, environmental management, and process steps.

vention initiatives and best manufacturing practices.

The single biggest task facing corporate environmental managers is how to engage senior management in a dialog about their problems and the positive results attained by solving them. Those same environmental managers must also understand that there are other, equally important, issues in a corporation besides the environment.

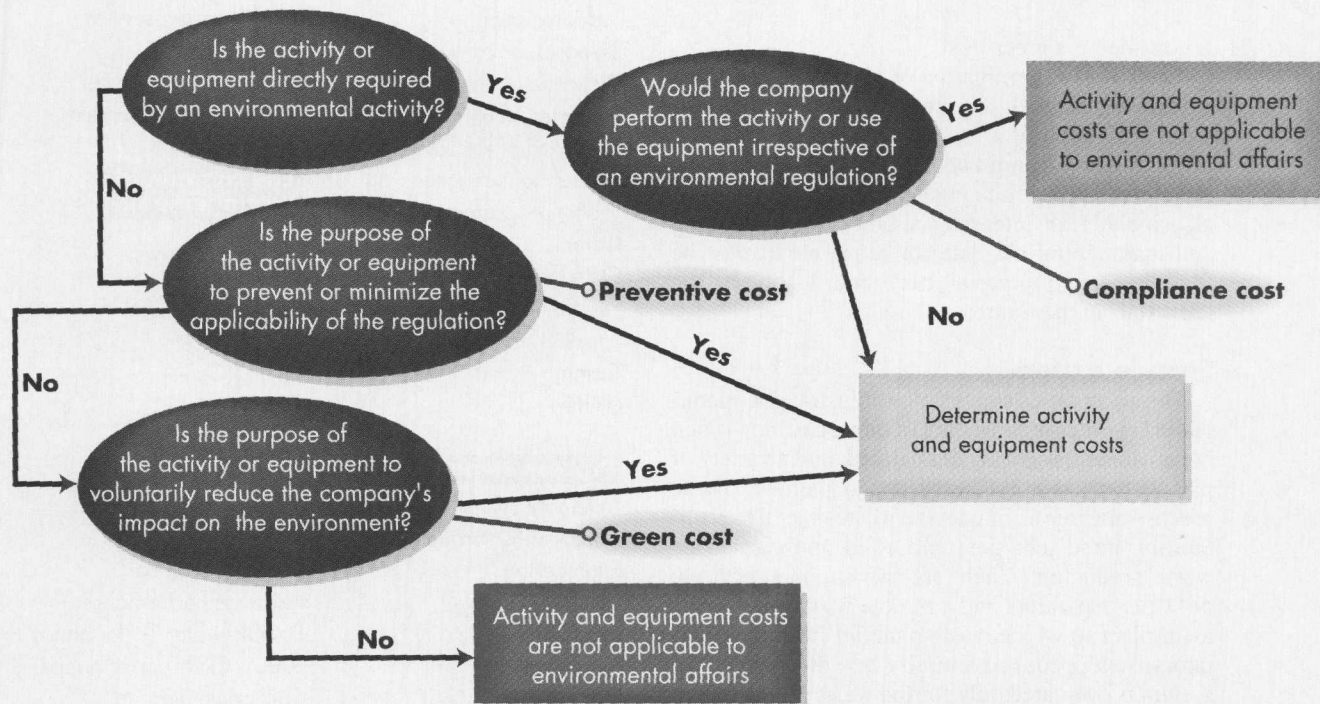
Know the numbers

Most environmental managers are not trained as accountants, and usually do not have business degrees. This lack of financial training and

expertise often puts them at a disadvantage at capital budgeting time when competing with other, more financially seasoned line managers who have a better grasp on their costs (or think they do).

Those same line managers are also contributing positively to the bottom line — something environmental managers have not done until recently with the advent of pollution prevention and the positive economic benefits it brings to the enterprise.

How does the environmental manager level the playing field? The simple answer is to provide senior management with a thorough understanding of costs associated with the enterprise. To do that, the manager must be provided with an effective way



to identify environmental costs.

Most organizations do not adequately detail their cost of doing business, least of all their environmental expenses. While companies employ a variety of cost accounting systems to quantify their operations, all must comply with generally accepted accounting practices (GAAP) or Security and Exchange Commission (SEC) regulations.

Simple as ABC

In recent years, managers have begun to embrace activity-based costing (ABC). When an ABC system is deployed, the corporation is able to break down all cost functions within the system and assign them to specific areas. For example, all EHS costs could be assigned to specific manufacturing and nonmanufacturing activities, waste streams, remediation projects, or any other area deemed appropriate.

While many companies are already using ABC to justify EHS improvements, most are not. For those companies without ABC, the burden of revamping a cost accounting system to better allocate direct and indirect (overhead) costs is simply too burdensome.

On the other hand, as companies move from a facility-by-facility focus to a more global view (literally and figuratively), enterprisewide accounting solutions are inevitable. When a company makes the shift to such an enterprisewide system (such as Ora-

cle or SAP), ABC accounting is often employed.

For companies that are not contemplating enterprisewide solutions, or are simply unwilling to undertake the effort to convert to an ABC costing system, what is to be done? There are some intermediate routes that can be taken.

Methodology

If the ABC method of cost accounting is not adopted, what alternatives are available to make estimates of environmental outlays associated with the manufacturing operations? The "environmental cost decision tree" above is used to evaluate whether or not a particular activity or piece of equipment is an environmentally related activity.

The illustration depicts three types of environmental costs: compliance, preventive, and green.

Compliance costs are associated with equipment or activities which are directly required for environmental reasons, and either the activity or equipment would not be used if regulations were not the driver.

Preventive costs are associated with an activity or equipment which will prevent or minimize the applicability of a particular regulation.

Green costs are an activity or piece of equipment used to voluntarily reduce the company impact on the environment, and are not required specifically by regulation. In today's marketplace, pollution prevention (waste minimization or cleaner production)

is considered a green cost.

The initial determination of environmental costs is labor intensive. It requires a systematic and thorough evaluation of a variety of different factors in order to gain a comprehensive understanding. This structured approach to collecting information must also include an integrated method for cataloging and maintaining the data for retrieval. It must be flexible enough to permit easy modification by the EHS staff in the future.

Sample system

The schematic layout below illustrates a manufacturing process consisting of metal castings which are machined, washed, and painted; and a variety of plastic parts that are washed and painted. These process operations impact the wastewater treatment facility, air discharges, and solid and hazardous waste production. There are two support services: oil/water separators and a remote wastewater treatment plant to which waste material from the separators is shipped. (To simplify this discussion, the system is evaluated only for the waste management issues. Air, spill prevention, and other areas of concern would be studied in a similar manner.)

The first step in evaluating environmental costs is to establish categories for data collection. Areas include the cost types, process categories, environmental management, and process steps. Table I lists

Table I.
Environmental cost categories

Cost type:

Capital equipment/
depreciation
Disposal, hazardous
Disposal, nonhazardous
Expensed equipment
Labor/administrative
Labor/maintenance
Labor/programmatic
Other
Outsource
Permit/license fee
Supplies/materials
Training
Utilities

Process category:

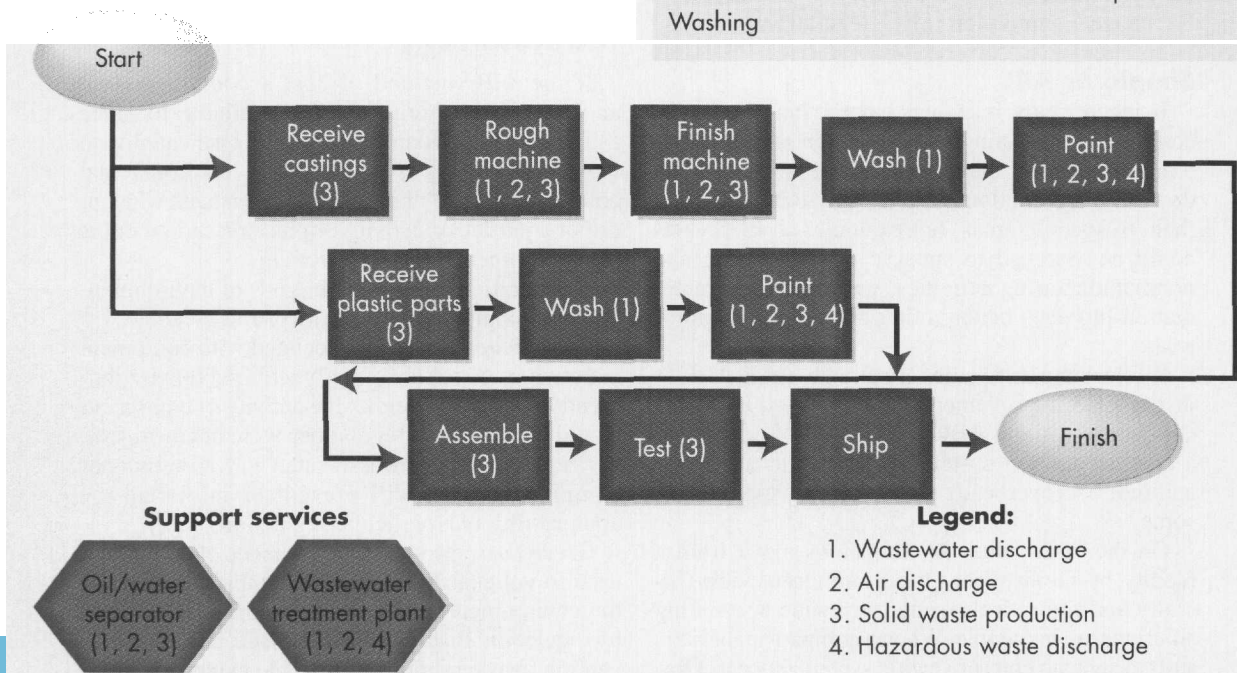
Corporate support
Direct support service
Final product
Intermediate product
Indirect support service

Environmental management:

Air
Asbestos
Potable water
SARA/CRTK
Spill prevention
Storage tanks
Stormwater
Waste, hazardous
Waste, nonhazardous
Wastewater
Air performance
Asbestos performance
Potable water performance
SARA/CRTK performance
Spill prevention performance
Storage tanks performance
Stormwater performance
Waste, hazardous performance
Waste, nonhazardous performance
Wastewater performance

Process step:

Assembly
Corporate environment
Engineering
Finishing
Machining
Maintenance
Maintenance WWTP
Media finishing
Paint
QA
R&D
Receiving
Shipping
Testing
Tool & die
Washing



the components in these four categories.

When evaluating cost types, environmental management, or process categories, assignment of an activity or equipment expense into one of them is relatively easy and intuitive. Evaluation of a process step to ascertain associated environmental activities, or to identify a specific piece of equipment whose function is environmentally oriented, may be somewhat more difficult for the field evaluator.

When an evaluation team looks at the process

steps, three regulatory issues of concern are identified: 1) Proper characterization of oil wash system filters prior to disposal, 2) characterization of the waste discharge from the system, and 3) documentation of the method of transportation/handling of the waste. These issues all pose potential, significant threats to existing permits.

The cost breakdown identified several appropriate areas. Labor/administration and labor/maintenance costs for the operation are at the top of the list.

Table II. Results from cost evaluation

A: Aggregate cost by environmental management category

EM category	Aggregate total, \$	Total, %	Fixed, %	Variable, %	Sporadic, %
Air	553,920	35.10	3.76	39.50	56.75
SARA/CRTK	1350	0.09	37.04	62.96	—
Spill prevention	3600	0.23	—	—	100.00
Waste, hazardous	120,568	7.64	0.50	99.50	—
Waste, nonhazardous	102,624	6.50	3.72	96.28	0.00
Wastewater	796,252	50.45	12.96	52.50	34.54

B: Aggregate cost by process step

Process step	Aggregate total, \$	Total, %	Fixed, %	Variable, %	Sporadic, %	Direct, %	Indirect, %
Assembly	53,625	3.40	—	100.00	—	100.00	—
Corporate environment	153,262	9.71	5.94	56.26	37.80	100.00	—
Machining	98,600	6.25	0.00	100.00	0.00	100.00	—
Maintenance	24,449	1.55	0.37	84.91	14.72	81.41	18.59
Maintenance WWTP	755,473	47.87	13.68	49.92	36.40	96.76	3.24
Paint	728,228	46.14	4.76	47.17	48.07	68.77	31.23
Testing	19,971	1.27	19.11	80.89	0.00	85.25	14.75
Washing	4123	0.26	—	100.00	—	100.00	—

C: Aggregate cost by activity cost type

Activity cost	Aggregate total, \$	Total, %	Fixed, %	Variable, %	Sporadic, %
Capital equipment/ depreciation	23,847	1.51	100.00	—	—
Disposal, hazardous	249,296	15.80	—	100.00	—
Disposal, nonhazardous	40,193	2.55	—	100.00	—
Expensed equipment	535,000	33.90	—	—	100.00
Labor/administrative	130,439	8.26	—	57.27	42.73
Labor/maintenance	30,390	1.93	—	100.00	—
Labor/programmatic	203,225	12.88	47.24	52.76	—
Outsource	35,750	2.27	—	93.85	6.15
Permit/license fee	19,946	1.26	45.62	54.38	—
Supplies/materials	295,228	18.71	—	100.00	—
Training	15,000	0.95	—	100.00	—

Other costs included depreciation, supplies, and disposal costs associated with the wastes generated by the machines.

Results

Table II reveals some of the results from the environmental cost evaluation.

Section A illustrates aggregated cost by environmental management category for the entire facility. Data indicate that air and wastewater issues are the most expensive environmental costs. A more careful review shows that expenses for both hazardous and nonhazardous wastes are highly variable and reveals the possibility of pollution prevention opportunities to reduce these costs.

Random spills at the facility result in sporadic prevention costs. While uncontrollable, the fact that they occur offers insight into opportunities for improvement through prevention and training.

Section B provides another way of looking at the costs associated with the process steps. For example, nearly 38% of the corporate environmental costs are associated with sporadic charges. This figure would lead the environmental manager to question the basis for corporate "fire drills" to respond to environmental matters.

Forty eight percent of the costs associated with painting are also sporadic. This amount was a revelation that pointed to improperly functioning spray guns which required too much off-line service. New spray guns corrected this problem (and saved paint as well as maintenance time).

Section C depicts aggregated expenses by a particular activity cost type. Less than 3% of all of the manufacturing costs are associated with outsourcing.

This particular fact came to the attention of a plant supervisor, who was determined to establish whether or not outsourcing of the oil skimming devices was feasible. Prior to this time he had given no thought to the concept, but when he saw a full accounting of all environmental costs associated with this equipment, he became convinced to look at alternative ways of managing the expenses associated with his operations. This "out-of-the-box" thinking is precisely why an analysis such as that conducted in this study should be undertaken by corporations.

There are several conclusions that can be drawn from the indepth analysis.

- ❖ Organization and work process issues are the key environmental cost drivers within the company.
- ❖ Need for remediation and provision for contin-

gent liability costs are manifestations of a breakdown of the environmental management system.

- ❖ Identified environmental management issues have organizational root causes.
- ❖ Data management systems are a key factor in the better control of environmental matters at the company.
- ❖ Environmental performance measures are the key control factor in evaluating facility environmental performance.
- ❖ Existing environmental management system is not adequate to the task.

Recommendations

Several suggestions were initiated based on the evaluation.

- ❖ Develop a formal environmental management system modeled along ISO 14001 guidelines. This model would provide senior management commitment to the process, give a detailed environmental road map of activities within the company, and result in a program of goal-oriented planning and implementation.
- ❖ Eliminate process breakdowns by revamping the capital budgeting process to ensure the inclusion of environmental costs.
- ❖ Develop a more formal environmental management system that would bring together facilities engineering, manufacturing operations, and the EHS group to eliminate disconnects and the obvious redundancy which results from process breakdowns.
- ❖ Establish clear lines of accountability for environment roles, dividing the responsibilities between senior management, corporate management, and inline manufacturing operations.
- ❖ Provide new opportunities for pollution prevention in the organization. Operations such as water reuse, steam cleaning vs water cleaning, automation, and segregation of metal scraps are just a few of the savings gained by pollution prevention, compared to end-of-the-pipe controls.

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More info

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